No. XII.

OIL-PRESS.

The Thanks of the Society were voted to T. BRAMAH, Esq. of Pimlico, Chairman of the Committee of Mechanics, for an Account of the Application of the Hydro-Mechanical Press to the Extraction of Oil from Seeds.

IN Vol. XXIV. of the Society's Transactions is an account of the successful application made by Messrs. Bramah of their hydro-mechanical press to a vertical oil press, for the purpose of extracting oil from the cocoa-nut. This volume coming under the notice of Mr. Henry Plump, of Bremen, induced him to apply to Messrs. Bramah to construct for him two oil-presses for seeds, on the same principle, but to act horizontally as the common oil-mills do. The order was accordingly executed, and the machinery being sent to Bremen, was put up, and has given complete satisfaction.

Extracts from a Letter to J. Bramah and SONS, written by Mr. L. G. Treviranus, Civil Engineer, of Bremen.

Dated Kurthouse, near Tulich, Dec. 13, 1822.

I am sorry that, in consequence of my absence from Bremen, I did not receive your letter, of the 26th ult., sooner than two days ago.: with pleasure, however, I

shall comply with your request, and answer your inquiries respecting the performance of Mr. Plump's presses.

From the time when all things belonging to Mr. Plump's mill were finished, and the presses had the new followers put to them (at the end of December 1821) they have been, with but little interruption, very regularly at work, and continued so till about a month since, when I left Bremen.

Mr. Plump is perfectly satisfied with them, and is convinced that amongst all the known contrivances for the pressing of seeds he has chosen the best.

In all, there are employed at the mill three men and one boy: one of the men has the charge of warming the seeds in the pans and filling the bags; another takes care of the pressing: the boy takes the cakes out of the bags, trims them, and puts the bags into their proper place; the other man has the management of grinding the cakes from the first pressing under the vertical runners: they had been, in the first instance, bruised between cast iron rollers, before submitting them to the first pressing. The first pressing is effected as speedily as possible, viz. in about six minutes, but in the second more time is allowed.

In the way represented above, there was pressed, in the beginning of the year 1822, from five o'clock in the morning to seven at night, say in twelve working hours, half a last in Bremen weight,—according to the specific gravity of the seeds, from 2000 to 2020 lbs.; but when I left Bremen, they pressed regularly every week $4\frac{2}{3}$ lasts, equal to from 2667 to 2693 lbs. in the same time.

The product of oil got from a last of seed (*i. e.* from 4000 to 4040 lbs.) varied with the quality of the seed from 1300 to 1600 lbs.; about 1500 or 1550 lbs. I consider

to be an average. From this about 1250 lbs. are obtained the first, and 300 lbs. the second time.

Several comparative trials with the same seeds have been made at Mr. Plump's mill, and at a fine Dutch wind-mill (served by Dutchmen) at Bremen, and the results have always proved in favour of the former.

Observations.

From the foregoing extracts, it will appear evident that the effect of the hydro-mechanical presses (in expressing oil from seeds) is not inferior to that of the ordinary method by stampers, as will be confirmed by the annexed account of the general work of a good stamper mill in this country, compared with that belonging to Mr. Plump. It may also be remarked, that the hydro-mechanical presses have other important advantages, which are chiefly as follow, viz.—

1st. No peculiar locality for the erection is necessary.

2d. The space required for each press is much less than that which would be occupied by a sufficient number of stampers to contain a like quantity of seed.

3d. The expense is not greater than that of the best-constructed stampers.

4th. The operation of pressing is accomplished without any noise, or motion to the foundation or building.

5th. The principle of the communication with the pumps admits of the presses being placed at any distance from, and in any direction to, the position of the first mover, which a peculiarity of situation may demand.

6th. The hairs and bags are found to last much longer than those used in the stamper presses.

To form a correct comparison between the daily produce of Mr. Plump's presses and that performed by the stampers, I have ascertained from Michael Shepley, Esq. who has a large mill at Carshalton, in Surrey, that the regular work of three men at the stampers amounts to seven quarters two bushels of seeds, or 58 bushels per day; and that 47 lbs. is the full average weight per bushel of good seed.

From the foregoing statement of Mr. Treviranus, the daily labour of two men and a boy, at the hydro-mechanical presses, produces from 2667 to 2693 lbs. Bremen weight, or $\frac{2667+2693}{2} = 2680$ lbs. Bremen on the average.

The ratio of the Bremen pound to that of the English is as 100 to 109·8, as appears from Dr. Kelly's Universal Cambist, so that 2680 lbs. Bremen weight will be $\frac{2680 \times 109{\cdot}8}{100} = 2942{\cdot}64$ lbs. English. This quantity divided by 47 (the average weight in lbs. of a bushel of seed) will be $\frac{2942{\cdot}64}{47} = 62{\cdot}6$ bushels, by which it appears that the labour of three men in the old mode produces the pressing of only 58 bushels per day; whereas in the improved method 63 bushels are accomplished with less labour in the same time.

T. Bramah.

References to the Engraving of the Horizontal Hydro-Mechanical Oil-Press. Plate XII.

In Vol. XXXIV. of the Society's Transactions is given a full detail of our vertical oil-presses, as applied by Mr. Hoblyn to the extraction of oil from cocoa nuts; it will, therefore, only now be necessary to describe the

changes made in the construction and arrangement of the different parts to accommodate them to the horizontal position.

Figs. 1 and 2 represent a front view and plan of two horizontal oil-presses.

Fig. 3, the two injecting pumps with their frame, cistern, &c.

Fig. 4, a plan of the cistern and injecting pumps, taken below the dotted line LM, in fig. 3.

Fig. 5, a section of a press-box and part of the cylinder, taken at the dotted line NO, in fig. 2.

Fig. 6, an end view of one of the cylinders, &c. All these figures are drawn upon a scale of half an inch to a foot.

Fig. 7 is an enlarged section of the stop and discharge valves, by which the necessary connexion is made between the pumps and cylinder.

A A A A are four brackets supporting the two cylinders, and affixed to cast-iron plates resting upon brick-work; B B the press cylinders; C C the wrought-iron bars; D D the cast-iron heads of the presses united with the oil-boxes; E one of the press pistons; F F the followers, each having a friction-wheel or roller at its under part, which moves upon the false bottoms of the oil-boxes. The followers are drawn back by means of weights attached to chains, passing over pulleys, and rising or falling in a pit made in the brick-work to receive them, as shewn by dotted lines. The seeds to be pressed are contained in woollen bags, which are enfolded by horse-hair mattresses, enclosed in leather wrappers, as in the ordinary oil-mill, and are placed in the oil-boxes, having cast-iron plates, grooved at their edges, with handles to each, placed between them, as seen in section on the

right-hand side of fig. 1, shewn in the compressed state. The expressed oil makes its escape through perforations in the false bottoms of the oil-boxes, and flows out by short pipes, technically called *teats*, made in the sides of the oil-boxes, to the reservoirs destined for its reception in any convenient part of the floor or underground premises. The oil which may occasionally exude at top is prevented from running over by the raised border of the box, and is conveyed to the bottom of the oil-boxes by a groove at the end of each box, communicating with the bottom W W. The injecting-pumps are so arranged as to be worked by a rotatory motion from a steam-engine or other first mover, communicated by a toothed wheel, as seen in dotted lines, fig. 3. This wheel is placed upon a horizontal shaft, at the end of which is a crank, fig. 4, capable of being rendered more or less eccentric, according to the required circumstances. Upon the neck of this crank is attached a connecting-rod to communicate motion to the beam above, as in fig. 3, and this beam actuates the two injecting pumps, by means of piston-rods furnished with the usual parallel movements, all of which being of ordinary and well-known construction, are not detailed in the drawings.

The particulars of the injecting-pumps having been fully described in the former communication, it is unnecessary to repeat them here; as, however, some additional contrivances are required to enable the pumps to produce the intended effect, we shall now proceed to describe these alterations:—

Viz. Each pump is provided with a distinct safety-valve instead of one common to both, as represented in the former drawings. One of these injecting-pumps has its piston made of four times the area of the other. This

pump injects at each stroke four times the quantity of water produced by the smaller pump, but its safety-valve is loaded with a weight proportionally smaller, so that its effect upon the seeds is confined to the commencement of the pressing, when the resistance is small, for the purpose of expediting the operation: as the resistance of the seeds increases, the power must likewise be increased; and therefore the lesser pump alone is employed to finish the compression: as, however, both pumps are continually worked by the engine or other first mover, so it becomes necessary, in order to avoid a needless expenditure of power, to relieve the larger pump of its labour, which is reduced merely to that of the friction arising from working the piston in the cylinder, the lever and weight of its safety-valve being raised by means of a line connected with it and passing over pulleys, so as to bring the handle at its other end conveniently within the reach of the workman; and thus the water from the large injecting-pump escapes, and falls back again into the cistern. The workman is apprised of the proper time for lifting this safety-valve, by the rushing noise which the water makes in escaping through it, as soon as the resistance is sufficient to produce this effect.

The injecting-pumps may be situated at a distance from the presses, and the water is conveyed to them through strong copper pipes placed under ground and continued up through the junction part Z to the stop and discharge-valves H and I, figs. 1 and 2.

A drawing of the left pair of valves, in fig. 1, upon an enlarged scale, is shewn at fig. 7, in which G is the pipe leading from the junction part Z; H the stop-valve which opens and shuts the communication from the pumps; I the discharge-valve, having a groove or channel

round it to permit the water to pass from the pumps to the press through the curved pipe J. When the press is to be released, it is only necessary to raise the screw-valve I, which allows the water to flow out at the waste-pipe K, through which it may escape back to the cistern, or be conveyed to a drain or sewer, as circumstances require. One pair of injecting-pumps may be employed to work four oil-presses with the same facility as two; but in this case two presses should be in action at once, whilst the others are recharging.

In order to allow for a small horizontal movement, which may take place by the alternate expansion and contraction of the wrought-iron bars C C, from the strain applied in pressing, so as to occasion the fracture of the copper pipes leading from the stop and discharge-valves to the cylinders,—we have found it necessary to bend them in a curved form, as shewn in figs. 1 and 7.